SOCIETAL LCA

Subcategory assessment method for social life cycle assessment. Part 1: methodological framework

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Abstract

Purpose The aim of this work is to propose an objective method for evaluating subcategories in social life cycle impact assessment (S-LCIA). Methods for assessing subcategories have been available since 2006, but a number of these either fail to include all the subcategories envisaged in the guidelines for S-LCA (UNEP/SETAC 2009) or are subjective in their assessment of each subcategory.

Methods The methodology is characterized by four steps: (i) the use of the organization as unit process, in which it was decided to assess the social profile of the organization responsible for the processes involved in the product life cycle, (ii) definition of the basic requirement to assess each subcategory, (iii) definition of levels based on the environment context or organizational practice and the data availability and (iv) assignment of a quantitative value.

Results and discussion The result of the method applied was the development of the subcategory assessment method (SAM). SAM is a characterization model that evaluates subcategories during the impact assessment phase. This method is based on the behaviour of organizations responsible for the processes along the product life cycle, thereby enabling a social performance evaluation. The method, thus, presents levels for each subcategory assessment. Level A indicates that the organization exhibits proactive behaviour by promoting basic requirement (BR) practices along the value chain. Level B means that the organization fulfils the BR. Levels C and D are assigned to organizations that do not meet the BR and are differentiated by their context. The greatest difficulty when developing SAM was the definition of the BR to be used in the evaluation of the subcategories, though many indications were present in the methodological sheets.

Conclusions SAM makes it possible to go from inventory to subcategory assessment. The method supports evaluation across life cycle products, thereby ensuring a more objective evaluation of the social behaviour of organizations and applicable in different countries.

Recommendations When using SAM, it is advisable to update the data for the context environment. The method might be improved by using data for the social context that would consider not only the country, but also the region, sector and product concerned. A further improvement could be a subdivision of the levels to better encompass differences between organizations. It is advisable to test SAM by applying it to a case study.

Keywords Characterization model · SAM · Social impact assessment · Social life cycle assessment · Stakeholders · Subcategory assessment method

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1 Introduction

Social life cycle assessment (S-LCA) is a fairly new technique for evaluating potential positive and negative impacts across the life cycle of a product (UNEP and SETAC 2009). It enables us to assess the behaviour of organizations and to

gain a better understanding of this behaviour and its development in relation to the various stakeholders.

S-LCA is similar to (environmental) LCA, in that it comprises four phases: goal and scope definition, inventory analysis, impact assessment and interpretation. It does, however, require some adaptations (Grieβhammer et al. 2006).

As regards social life cycle impact assessment (S-LCIA), the shift from inventory data to the social impacts considered in S-LCA presents a challenge. UNEP and SETAC (2009) proposed two types of approach to S-LCIA which, according to Parent et al. (2010), can be considered as characterization models for the life cycle impact assessment phase. Type-1 S-LCIA is performed over two assessment steps: the first one relates data to subcategories. For this type-1 S-LCIA, UNEP and SETAC (2009) established 31 subcategories associated with five stakeholder categories (worker, consumer, local community, society and value chain actors). Failure to take into account any one of the subcategories is an issue that needs to be justified; however, new subcategories can be included.

Methodological sheets for each of these subcategories were subsequently developed to include definition, contribution for the sustainable development, measurement unit and even possible data sources (UNEP and SETAC 2010).

Assessment of these subcategories can be made by using performance reference points (UNEP and SETAC 2009), which provide thresholds to understand the magnitude and the significance of the data collected during the inventory phase. One example of a reference point is due observance of the weekly average working hours as defined by the International Labour Organization (ILO) (ILOLEX 2012). An organization that fulfils this requirement is accorded a higher score than those that do not respect the weekly average working hours. The thresholds should be defined according to a rule. Thereafter, the subcategories can be grouped under one or more impact categories or stakeholder categories. UNEP and SETAC (2009) listed six impact categories: human rights, working conditions, health and safety, cultural heritage, governance and socioeconomic repercussions. These categories have been internationally recognized, although their measurement and definition still poses a challenge.

Type-2 S-LCIA evaluates impacts according to the use of impact pathways, where the inventory indicator is translated into a midpoint and then, eventually, into an endpoint indicator. This approach reflects that of (environmental) LCA. Three endpoints (human capital, cultural heritage and human well-being) were listed by UNEP and SETAC (2009); the latter with seven midpoints (health, autonomy, safety, security and tranquility, equal opportunities, participation and influence and resource (capital) productivity).

Over the years, the existing literature has proposed a number of methods for the characterization step. The first proposal

was developed by Weidema (2006), who created a new indicator at endpoint level, the quality-adjusted life years (QALY). This indicator has six damage subcategories grouped under the general category "human well-being". QALY groups the results by a combination of different statistical data. QALY uses a similar approach to the disability-adjusted life years (DALY) method adopted by the World Health Organization (WHO), though QALY is a measure that includes both the quality and quantity of life lived.

Norris (2006) related life expectancy in several countries to the gross national product and developed a characterization factor that could be used in relation to wages.

In the same period, Hunkeler (2006) suggested the use of labour hours as an intermediate variable in the calculation of social life cycle assessment. He assumes that processes can be broken down into labour statistics, by considering only a single impact category (e.g. housing, health care or education within a given region).

The approaches developed by Weidema, Norris and Hunkeler display some common features, such as the use of quantitative data. According to Parent et al. (2010), these approaches are classified as type-2 S-LCIA.

There are also other methods regarding type-1 S-LCIA. For example, Dreyer et al. (2006) put forward a framework for social life cycle impact assessment showing that the two goals (social responsibility and competitiveness in the market) were not in conflict with each other. The authors proposed a characterization model based on multicriteria indicators for four subcategories related to stakeholder workers: forced labour, discrimination, restrictions of freedom of association and collective bargaining and child labour (Dreyer et al. 2010a). The application of this model to six companies showed that it was best suited to larger, traditional enterprises primarily employing blue-collar workers, due to the employment conditions, type and organization that characterize these companies (Dreyer et al. 2010b). Although the model is comprehensive for the stakeholder workers, it cannot be usefully applied to other stakeholder categories.

Group Ageco and QUANTIS developed a method that focused on the agri-food sector that includes all five stakeholders proposed by UNEP and SETAC (2009). However, it does not assess all the related subcategories, and some subcategories were created specifically for the agricultural sector. This method evaluates the processes at four different levels: committed behaviour, proactive behaviour, compliant behaviour and risk behaviour (Couture et al. 2012).

SEEBALANCE is a method created by BASF to assess social aspects (BASF 2013). The social impacts are grouped under five stakeholder categories (employees, international community, future generations, consumers, and local and national community) and related subcategories, which differ from those of UNEP and SETAC (2009). A limited number of indicators are

considered for each stakeholder category, for example the number of employees. The indicators are summarized in a social fingerprint and use a social weighting factor for subcategories and stakeholders (for example 25 % employees, 20 % consumer, 20 % local and national community) (Gipmans et al. 2012).

Ciroth and Franze (2009) proposed an improved assessment method to evaluate social impact based on UNEP and SETAC (2009) in 2011 (Ciroth and Franze 2011). This method evaluates both qualitative and quantitative data and transforms them into a quantitative evaluation for each subcategory through a rating scale (1 to 6), where 1 indicates the best score and 6 the worst. These ratings are then grouped into impact categories, thereby obtaining a single score (Ciroth and Franze 2011). This method was applied to a laptop and was one of the first applications to involve all the subcategories (apart from consumers) envisaged by UNEP and SETAC (2009). Both the assigning of data to each subcategory and the grouping of the subcategories under impact categories are based on subjective evaluation; this could lead to differing evaluations according to the evaluating subject.

Some of the methods proposed for S-LCIA type 1 does not include all the subcategories suggested in the guidelines or are not objective in their assessment of each subcategory. Due to those limits, the objective of this study is to propose a subcategory assessment method (SAM) which will include all subcategories and related stakeholders and reduce the variance in evaluation.

2 Method development

The method was developed to include all the subcategories and related stakeholders set out in the guidelines (UNEP and SETAC 2009). The methodology is characterized by four elements: the mode of correlation between product assessment and the subcategories, uniformity in assessing the subcategories, the presence of assessment levels and a semi-quantitative character.

2.1 The use of the organization as unit process

Initial debate concerned how to assess the product through the subcategories. It was decided to assess the social profile of the organization responsible for the processes involved in the product life cycle. This approach was also chosen by Dreyer et al. (2010a) as these authors concurred that companies are responsible for the people affected by their business activities, yet need to be able to compete and make a profit in order to survive in the marketplace. Hence, the subcategories are assessed through each process in a way similar to that of environmental life cycle assessment.

2.2 Definition of the basic requirement to assess the subcategories

In order to produce a consistent method for all subcategories, it was decided to establish a baseline to assess the organization's profile, which we termed the "basic requirement" (BR) (Electronic Supplementary Material 1). The definition of the BRs for each subcategory was based on the methodological sheets (UNEP and SETAC 2010), which provide information on what each subcategory should assess and on actions which the organizations might undertake. For example, for the subcategory "fair salary for stakeholder worker", the methodological sheets define fair wages and give examples of how to measure a fair wage: minimum wage required by law, local "prevailing industry wage" and a "living wage", also sometimes designated as "floor wage" or "non-poverty wage". In this way, SAM accepted a minimum wage as a basic requirement. Some BRs may refer to international agreements or indicators concerning organization management. Where the methodological sheets did not specify practical information that could be collected, we chose to accept feasible measures adopted by the organization. For instance, for the "equal opportunities/discrimination" of stakeholder worker subcategory, the methodological sheets define "fair chance" and state that "everybody has the right to be treated fairly and access to equal opportunities". In this case, no data source or unit of measurement was identified; SAM, thus, used the presence of a management system, policy or actions to prevent discrimination and promote equal opportunities for workers as its criteria.

2.3 Definition of levels

The authors initially considered defining three levels: the first level was to be reserved for organizations with proactive behaviour relating to the BR and would correspond to level A; the second level (B) was to refer to organizations fulfilling the BR; the last level (C) was to be organizations not fulfilling the BR. It was then deemed necessary to split the last level into two levels that would take the organization's background context into account. This additional consideration was important, as an organization operating in a negative context may have greater difficulty in implementing social actions. For example, in working hours, issues can be met more easily in one country (positive context) than in another. Countries with positive context stimulate companies to comply with the international agreement requirements. The method, therefore, envisages both level C, which refers to an organization that does not fulfil the BR and operates in a negative context and level D, which includes organizations that do not fulfil the BR though operating in a positive context (Fig. 1).

2.4 Assignment of a quantitative character to the method

A rating scale was related to the level assessment (Table 1) in order to facilitate an overview across the product system. The method is, thus, semi-quantitative and a bar graph can be used to summarize the product system (Fig. 2).

3 Subcategory assessment method

Subcategory assessment method (SAM) takes into account all the subcategories envisaged in the guidelines for S-LCA (UNEP and SETAC 2009). SAM can be considered as a characterization model to be used after the inventory phase that enables an assessment of the social profile of the organization involved in the product life cycle that is related to BR fulfilment.

Each organization in the life cycle of a product/service can be evaluated using SAM. In order to provide a more objective assessment, SAM is based on a four-level scale (A, B, C or D) for each subcategory. These levels must be clearly defined for the practitioner to apply the method in a standardized manner

throughout all evaluations. Figure 1 indicates how to proceed in the subcategory assessment using SAM.

Level B corresponds to an organization that fulfils the BR taken as the reference point/threshold; this threshold may, for example, be based on international agreements as shown in Table 1, in accordance with the indicators set out in the methodological sheets (UNEP and SETAC 2010).

Level A indicates that the organization has a proactive behaviour as it promotes good practices in the value chain, besides fulfilling BR by contractually stipulating the activities of its suppliers or partners. This is based on one of the principles of Rio + 20 Corporate Sustainability Forum (2012), whereby correct behaviour is to be supplemented by the continued improvement and sharing of best practice. Hence, the essence of the subcategory "promoting social responsibility" was included in the evaluation of all subcategories and was, therefore, no longer present as a separate subcategory. The choice of using "promoting social responsibility" as level A has potential implication on the assessment results. One implication is that the method assess equally the organization with one proactive behaviour and those that have more than one proactive action. Another implication on the product assessment is that when in the product value chain
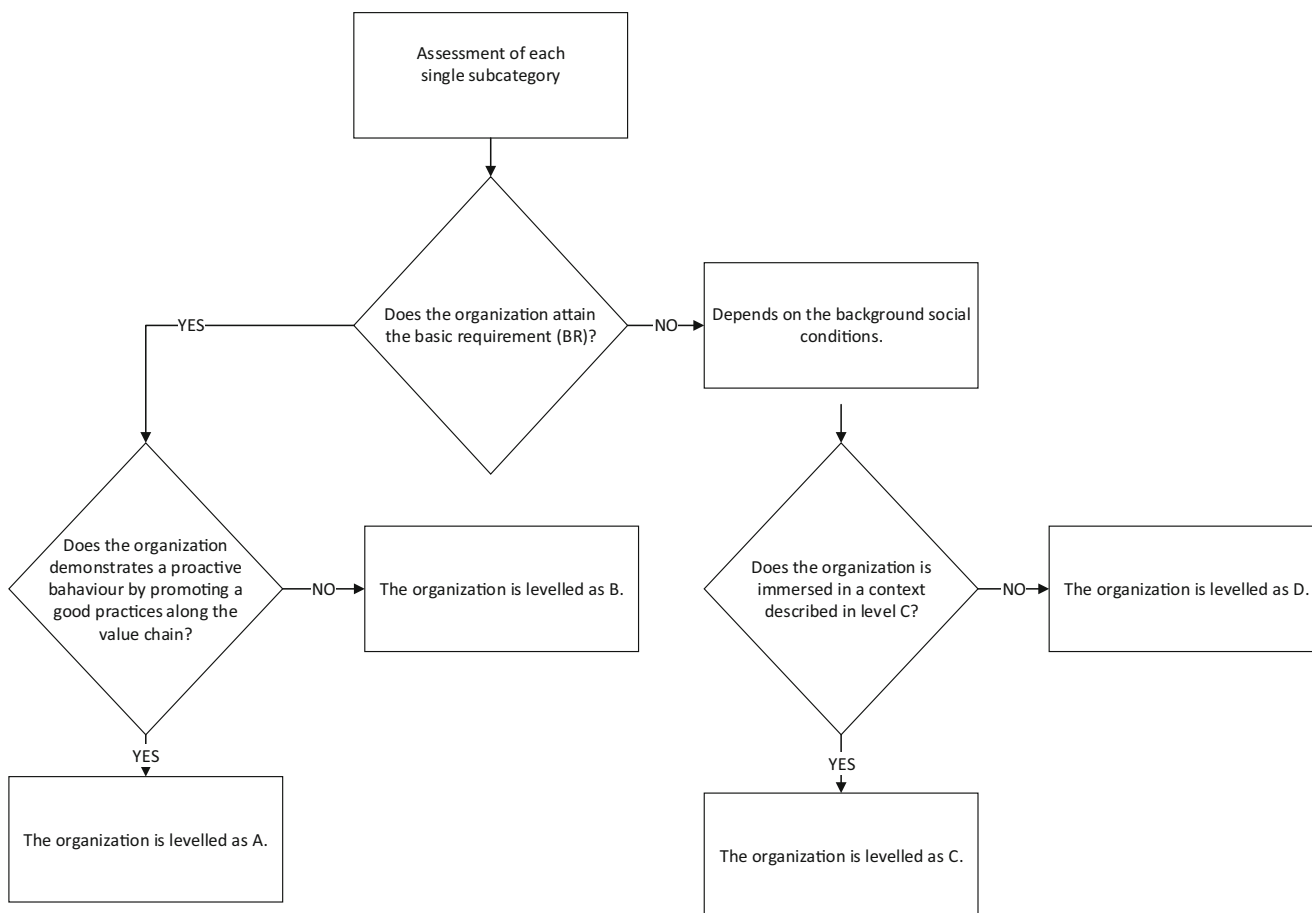

Fig. 1 Evaluation steps of a subcategory by SAM

Table 1 Scale levels and score

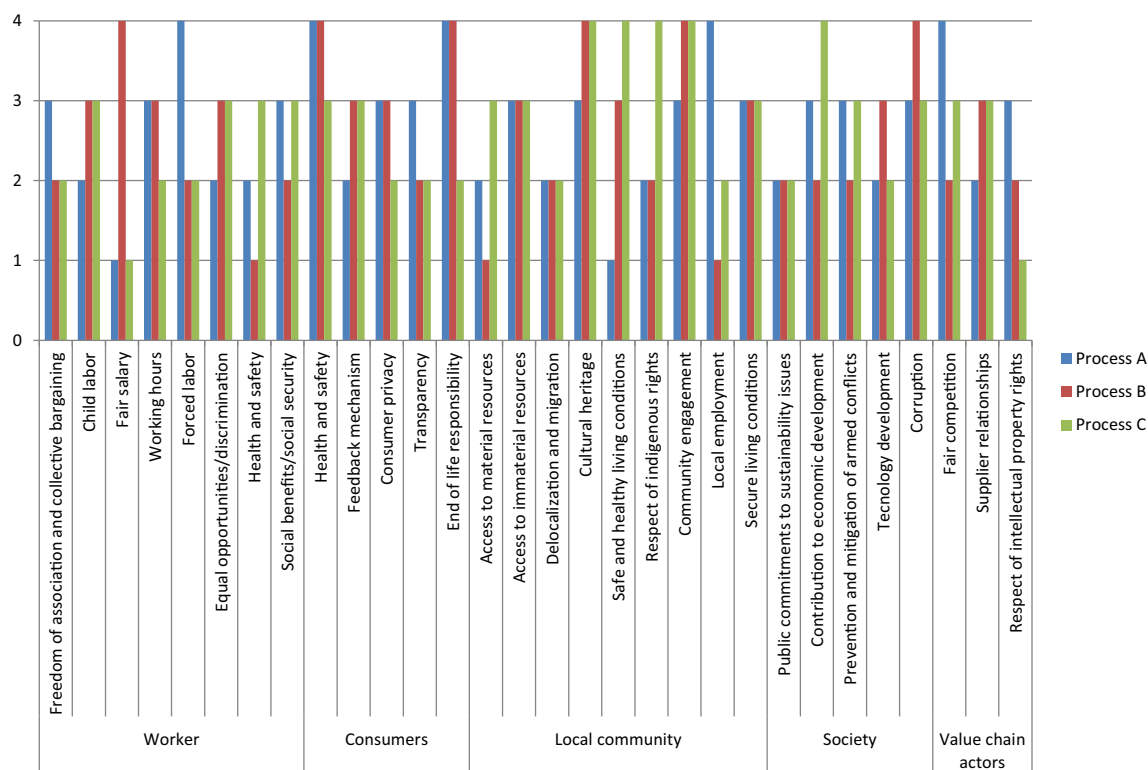| Level	A	B	C	D
Scale Score	4	3	2	1

there is an organization promoting proactive social actions, there is a bigger opportunity to present others organization with good social performance because they are influenced by the organization that have proactive behaviour which improves the product social performance. One implication in the assessment results is that the method equally assesses the organization having one proactive behaviour as well as those having more than one proactive action. Another implication in the product assessment is that when there is an organization promoting proactive social actions in the product value chain, there is a bigger opportunity to present other organizations with good social performance as they are influenced by the organization which has proactive behaviour improving the product social performance.

On the other hand, levels C and D identify the organizations which do not comply with the BR. Assignment to each of these levels was based on the social conditions in which the organization operated, preferably the country or sector context; when this information was not available, the organization itself provided the information. SAM uses the context of GreenDeltaTC Social LCA database 2011. This database is in preparation by Green Delta TC organization; the database

will contain raw data for various indicators at the country and sector level (Greendelta 2013).

In some subcategories, a number of processes can be marked not applicable (NA) when the subcategory is not relevant, and a justification for this decision will be added. For example, in the subcategory "Indigenous Rights", some organizations may state that there are no indigenous communities in the areas impacted by the organization's activities and an absence of any conflict with the local community. In this case, this subcategory would be marked "NA".

As SAM is based on the organization's behaviour, it is important to identify which organization is responsible for each unit process within the life cycle. When a multinational is involved in the product system, the user can choose to either use the data of the site plant or those of the corporate policies or actions taken by the multinational organization, since the corporate actions can affect all the sites involved. This principle can be used because it follows the main organization evaluation where the unit process is related to the organizations behaviour and social impacts caused by them. However, this choice will make difficult data collection and analysis. The data collection will need to be performed in all sites where the multinational organization has a plant. In this way, if the multinational organization presents a poor performance in one site, it will be highlighted in any of its products. Therefore, this kind of organization will be encouraged to develop better social conditions on the site where it has poor performance.

Fig. 2 Bar graph to summarize the product system

For example, a child labour policy is usually equal for all sites in a multinational organization. The authors also consider that a bad practice on one site reflects globally on the multinational's behaviour and that this should be weighed in the assessment.

3.1 SAM for stakeholder: workers

The BR for each worker subcategory (freedom of association and collective bargaining, child labour, fair salary, working hours, forced labour, equal opportunities/discrimination, health and safety, social benefits/social security) was defined according to Conventions of the International Labour Organization (ILOLEX 2012). For the subcategory "child labour", for example, the BR is "the presence of a policy to avoid child labour" or no evidence of child work. Child labour is defined by ILO Convention no.138 as hiring employees under 15 years in developed countries and under 14 years in developing countries and less developed countries. Organizations with no policy relating to child labour as defined by ILO Convention 182 (ILOLEX 2012) in a context where child labour is a common practice but does not consist in the "worst forms of child labour", or where the child attends school, are allocated to level C. Otherwise, the organization is evaluated as belonging to level D.

For this method, policy is understood to be a guiding principle or procedure that is set out in writing and which has become part of the organization's culture.

The same approach was applied to freedom of association and collective bargaining, working hours, forced labour, equal opportunities/discrimination, health and safety and fair salary.

A different approach was applied for social benefits and security, because of the several aspects included in this subcategory as suggested by ILO Conventions nos.130, 134, 128, 121, 168, 118, 157 and 183 (ILOLEX 2012). The BR in this case is the fulfilment of more than two of the required benefits (see Electronic Supplementary Material 2). Organizations that fulfil up to two of these requirements are assigned to level C, while those not fulfilling any of the social benefits and security requirements are assigned to level D. The detailed description for these subcategories is set out in Electronic Supplementary Material 2.

3.2 SAM for stakeholder: consumer

The method includes the five subcategories (health and safety, feedback mechanism, consumer privacy, transparency, end-of-life responsibility) from the stakeholder consumer. Only consumers of the final product are taken into account.

The BR is based on international agreements, such as ISO 26000 (ISO 2010), GRI (GRI 2006) and Consumer Protection Act (DTI 2013) and on other indicators from the organization such as presence of management systems which provide clear information on end-of-life options to consumers (subcategory "end of life responsibility") and customer feedback mechanisms (subcategory "feedback mechanisms").

As for the consumer privacy subcategory, the basic requirement is the presence of a policy that protects consumers' right to privacy, which is defined by the Universal Declaration of Human Rights, Article 12 (UDHR 2007), and by Consumer Protection Act (DTI 2013). If the organization does not meet the BR, it is assessed according to the Privacy International Ranking score of the country where the organization is located (Privacy International 2007). In the present method, the countries were split into two levels: those scoring between 1.1 and 3 (a) and those scoring between 3.1 and 5 (b). Countries assessed as "a" are those displaying worse conditions than those of the national privacy ranking. Accordingly, organizations located in these countries are assessed as C; otherwise, the organizations that are in a country where the context is adequate are graded D. A similar approach is applied to the health and safety subcategory.

The description applying to other subcategories of stakeholder consumers is set out in Electronic Supplementary Material 2.

3.3 SAM for stakeholder: local community

The method includes nine subcategories (access to material resources, access to immaterial resources, delocalization and migration, cultural heritage, safe and healthy living conditions, respect of indigenous rights, community engagement, local employment and secure living conditions) from the stakeholder local community.

The BR, for the subcategory "cultural heritage", relates to evidence that the organization contributes to cultural and artistic programs (UNEP and SETAC 2010). In this method, evidence is understood as to be a document, procedure, rule, practice or any action forming part of the organization's behaviour that might prove fulfilment of the BR.

The difference between levels C and D depends on the risk of the disappearance of cultural heritage in a country (or region), based on the world heritages at risk supplied lists drawn up by UNESCO (2012). The countries were split into two levels: those that are at risk ("e") and those that are not ("f"). Thus, an organization that does not fulfil the BR in a country allocated "e" is assessed as belonging to level D; otherwise, it falls within level C. A similar approach for the BR is used for the safe and healthy living conditions. Assignment to either levels C or D depends on the country's DALY rate (WHO 2012).

The BR of the subcategories "access to material resources", "access to immaterial resources" and "delocalization and

migration" is assigned to organizations that include them in their internal management system practices. The difference between levels C and D for the latter depends on the net migration rate of the country as reflected in the Population Reference Bureau (2011). The subcategory "access to material resources" relates to the countries' human development index (HDI), as listed by UNDP (2010), while "access to immaterial resources" is decided on the basis of the technological readiness score (available in WEF 2010) and on the freedom of expression scores provided by Stiftung (2012).

As regards the "local employment" subcategory, there is currently no clear differentiation between countries, so a temporary solution was based on the country's employment rate (KILM 2012).

The description for all the local community subcategories is detailed in Electronic Supplementary Material 2.

3.4 SAM for stakeholder: society

The method includes the five subcategories (public commitments to sustainability issues, contribution to economic development, prevention and mitigation of armed conflicts, technology development and corruption) of the stakeholder society set out in UNEP and SETAC (2009). The BRs for the stakeholder society are described in Electronic Supplementary Material 2. The BRs of the technology development subcategory is related to the research and development of efficient and environmentally sound technologies by the organization (UNEP and SETAC 2010). For this subcategory, the difference between levels C and D depends on the country's investment in technology development, which is based on the percentage of public expenditure assigned to research and development in relation to the GDP, as set out in the Human Development Report (HDR) (UNDP 2010). The countries were split into two levels: those countries where the percentage ranges between 0 and 2.35 % (low investment) and those countries where it ranges between 2.35 and 4.75 % (high investment). Therefore, an organization that does not fulfil the BR in a country with high investment is assigned to level D, otherwise it is assigned to level C.

Likewise, for the corruption subcategory, the indicator for differentiating between levels C and D is the country's corruption perception index (CPI).

The BRs of the public commitments to sustainability issues subcategory is fulfilled by any undertaking or agreement relating to sustainability issues. If the organization does not promote sustainability, it is as allocated to level C where no record exists that it acts in breach of sustainability requirements, or to level D if proof exists that it does breach them.

The subcategories "economic development" and "prevention and mitigation of armed conflicts" are evaluated in a similar way (see Electronic Supplementary Material 2).

3.5 SAM for stakeholder: "value chain actors"

The method includes three subcategories (fair competition, supplier relationships and respect of intellectual property rights) from the stakeholder value chain actors as set out in UNEP and SETAC (2009). As previously mentioned, the subcategory "promoting social responsibility" is not included in SAM in order to avoid double computation, given that this is measured at level A of each subcategory. The BRs for the stakeholder value chain actors are shown in Electronic Supplementary Material 2. For example, the BR of the fair competition subcategory is evidence that the organization conducts activities in a fair way and in compliance with legislation on antitrust or antimonopoly practices (UNEP and SETAC 2010). Thus, if this requirement is fulfilled, the organization is assessed as B during the evaluation process. For this subcategory, the difference between levels C and D depends on whether there is a record of proven cases that the organization has adopted anticompetitive behaviour, or pursued trust or monopoly practices in the last 3 years. Therefore, an organization that does not fulfil the BR and presents a record of proven cases of anticompetitive behaviour or trust or monopoly practices is assigned to level D. Otherwise, if there is no such record of proven cases, it is assessed as C.

3.6 Data collection

Although SAM focus is on impact assessment, it is relevant here to provide an explanation on how the inventory should be conducted and connected to the method.

First of all, it is necessary to elaborate a questionnaire based on the guidelines from UNEP and SETAC (2009) and the methodological sheets (2010) for each subcategory and related stakeholder. It is important that the questionnaire is able to answer if the SAM basic requirement is or not achieved and if there is responsibility promotion in the value chain. The questionnaire may have more than one question for each subcategory. An example of questionnaire for the subcategory "working hours" is in Fig. 3.

Then, it is important to define who is going to be responsible for answering the questionnaire and reviewing and adapting the questionnaire language, if needed. As in S-LCA, it is important to perform a data triangulation; several actors should be approached. For example, for the stakeholder, workers may be collecting data from the organization under study management and the workers union. In this way, the data collected can be verified and show if a deeper collection is needed. Therefore, it is necessary to define the organizations involved in the triangulation for each stakeholder (e.g. for the stakeholder workers could be the workers, human resources department and workers union).

Fig. 3 Example of questionnaire of the subcategory working hours

Subcategory working hours

I.Is there overtime?
Is it taken into account in the contract?
Is it paid?

II.Indicate the number of overtime hours executed on average per week per month

	January, February	March, April	May, June	July, August	September, October	November, December
overtime hours executed on average per week						

III. Indicate the number of ordinary hours carried out on average per week per month

	January, February	March, April	May, June	July, August	September, October	November, December
ordinary hours carried out on average per week						

IV. Does the organization promotes to its suppliers (or to the companies in the value chain) policies and or practices to avoid excessive overtime?

The data collection can be done through different means, for example, interviews with the employee, organization documents (as GRI reports, for example) and web sites. In case that the BR is not fulfilled, background context data is needed. This data can be collected through social databases as Social Hotspot database and Greendelta TC.

When performing the entire product life cycle assessment, it is necessary to collect data for foreground and background processes distinctly. When applying SAM, it is necessary to collect data in order to evaluate if the basic requirements (BRs) have been met; otherwise, it is necessary to collect context data (CD). For foreground processes, the data which meet the BR are site specific, and the context data can derive from a social database which can be Social Hotspot Data Base (SHDB) or Green Delta TC social database. Data from background processes are generic and can come from the behaviour of similar organizations. It is suggested to create a social organization archetype database (not yet developed) where the organization behaviour is classified according to certain features, for example, country, region, organizational behaviour according to maturity (how much the organization I capable to do related to social issues), size and sector.

4 Discussion and outlook—method evaluation

In this paper, a method is proposed for the evaluation of subcategories in S-LCA based on UNEP and SETAC (2009) and the methodological sheets (UNEP and SETAC 2010).

The advantage of SAM compared to the CIROTH method (Ciroth and Franze 2011) is that it defines a basic requirement,

thereby providing an objective way to assess the subcategories and ensuring uniformity when assessing different products. By contrast with SEEBALANCE, SAM uses all the subcategories according to the UNEP and SETAC methodology. Moreover, while the Ageco and QUANTIS method (Couture et al. 2012) is specifically designed for the agri-food sector, SAM can be used for any product or sector field QUANTIS. The Dreyer et al. (2010a) method is designed exclusively for use with the stakeholder worker, while SAM can be used to assess all stakeholders.

SAM enables a semi-qualitative assessment to be performed. The basic requirements are constructed by using indicators suggested by the methodological sheets. Levels C and D take the country context into account when deciding whether an organization's behaviour falls short of the basic requirement. Furthermore, SAM is able to transform qualitative information into quantitative data (1 to 4; 1 being the worst assessment and 4 the best assessment), thus giving the method a semi-qualitative character. Hence, the method can be objective in analyzing an organization's social behaviour along the life cycle of products.

In most of the subcategories (76.67 %), the basic requirement is based on indicators related to organizational management, while in 3.33 % of cases, it is based on national statistics and in 20 % of the cases on international agreements. The definition of levels C and D is based on indicators concerning organizational management in 50 % of the subcategories, country indices in 33.33 %, national statistics in 10 % and on international agreements in 3.33 % of the subcategories.

In addition, the SAM method permits evaluation of both simple and complex products, which can comprise different contexts/countries along the whole value chain. This is due to

the fact that the basic requirements are based on international references which enable a systematic application.

A limitation to SAM is that when differences in organizational practices are subtle, this method of comparison between organization/process behaviour can provide results that fail to highlight any difference. For example, SAM would not be effective should one organization have more practices fulfilling the defined basic requirement than another organization. In this case, where SAM is to be used, both organizations would be allocated to level B. The creation of new levels (sublevels) could decrease the large disparities between each level (A, B, C and D) in SAM, though this adjustment could penalize organizations that have only one practice and do not have the means (e.g. financial/human and structure resources) to further expand. Moreover, during SAM, application may be different interpretations in relation to understanding what evidence is; in these cases, it is suggested to perform a sensitivity analysis.

Despite these limits, SAM provides a social product profile which highlights the best and worst processes and the related organizations. This can help value chain organizations to upheld basic and proactive social responsibility requirements. Further steps should include the development of a method to shift from subcategories to impact categories.

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